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1952
Annual Report
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Financial Statements



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PRODUCTION PROGRAMS

Presented in the succeeding pages are the statutory reports on operations of the Synthetic Rubber, Tin and Abaca programs for fiscal year 1952, required by the legislation under which the programs are conducted. These programs were initiated pursuant to powers delegated to the Corporation prior to and during World War II. They have been continued under legislative authority subsequently enacted in the interest of national security with the objective of achieving insofar as possible self-sufficiency in these highly strategic and critical materials.

The success of these programs has progressively reduced our dependence upon foreign sources, formerly inaccessible in wartime, for natural rubber, tin and abaca. The world's supplies of natural rubber and tin also have been controlled by relatively small groups which by arbitrary price increases were able to exploit our needs for these materials. The availability of synthetic rubber and of refined tin produced at the Texas City Smelter largely from western hemisphere ores, has gone far toward placing this nation, the largest consumer of rubber and tin, in a more favorable position to cope with problems which in the past have operated to the disadvantage of the national economy.

REPORT ON SYNTHETIC RUBBER OPERATIONS FOR FISCAL YEAR 1952

Legal Authority and Responsibilities

During the fiscal year 1952 the Corporation continued to carry out its synthetic rubber activities in accordance with the provisions of Public Law 469, 80th Congress (The Rubber Act of 1948) and Executive Order 9942, dated April 1, 1948. Public Law 575, 81st Congress, extended the earlier legislation and the authority for operation of the program to June 30, 1952. On June 23, 1952, Public Law 404, 82nd Congress, was enacted which extended existing legislation in effect until March 31, 1954. The principal responsibilities and functions of the Corporation under its authority are listed below:

1. *Production of Synthetic Rubber*—The Rubber Act provides that production of synthetic rubber from facilities operated by the Government or private persons shall be not less than 200,000 long tons per annum of general purpose rubber and not less than 21,667 long tons of special purpose rubber, of which at least 15,000 long tons shall be of a type suitable for use in pneumatic inner tubes.

On April 10, 1952, DPA directed that "if the requirements for GR-S drop to levels which would not justify production rates in excess of 600,000 long tons per annum, the rate shall be maintained at 600,000 until the Government-owned inventory of GR-S has been built up to 75,000 long tons. In the event requirements for GR-S further decrease, the production rate may then be correspondingly decreased to a minimum of 450,000 long tons per year, provided the inventory of GR-S is progressively increased as the production rate decreases so that the Government-owned inventory is at least 122,000 long tons at the 450,000 long tons per annum production rate." The Corporation is charged with the responsibility for the production of these quantities of synthetic rubber and of such additional quantities for voluntary use as it deems practicable.

2. *Maintenance of Standby Facilities*—The Rubber Act requires that there shall be maintained at all times within the United States active or standby rubber-producing facilities having an annual rated production capacity of not less than 600,000 long tons of general purpose rubber and not less than 65,000 tons of special purpose rubber, of which at least 45,000 tons shall be of a type suitable for use in pneumatic inner tubes. In addition to facilities in actual operation, the Corporation is responsible for the maintenance of a sufficient number of plants in standby to meet the foregoing requirements.
3. *Research and Development*—The Corporation is authorized to maintain a technologically advanced domestic rubber-producing industry.
4. *Lease, Sale and Disposal of Facilities*—The Corporation is authorized, subject to certain conditions, to sell or lease surplus facilities not necessary to fulfill the requirements of the Act and obsolete property not required for the production of the rated capacity of the facility in which the property is located. The Act also requires the formulation of a program for the disposal of the Government-owned rubber facilities to private industry and, pursuant to the Act, the Corporation has been designated by the President to undertake this task.

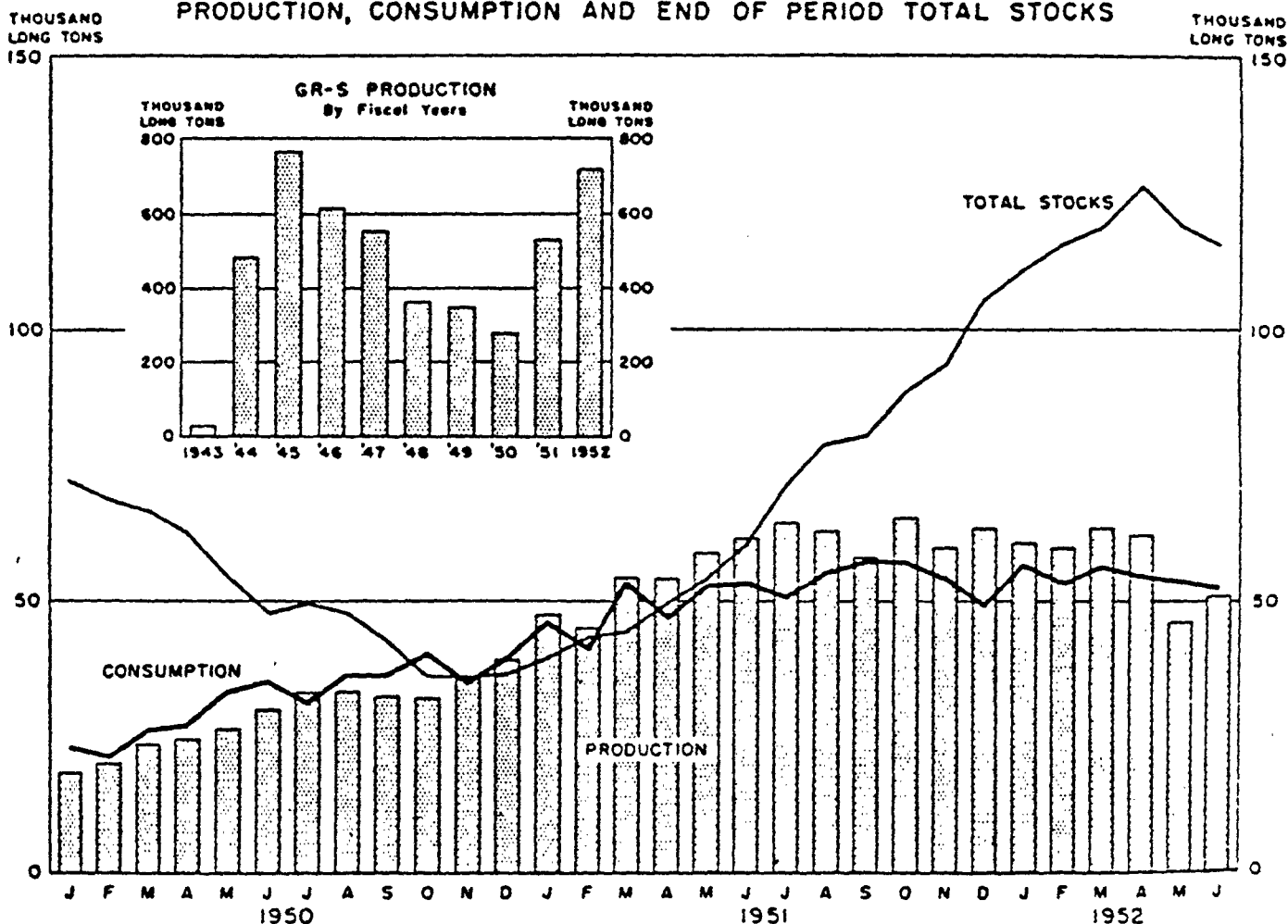
Rubber Requirements and Price Trends

The accelerated synthetic rubber production and continuing large volume of natural rubber imports during the year assured the nation's security insofar as an adequate supply of new rubber is concerned.

By July 1951, the production rate of general purpose (GR-S) synthetic rubber had reached the goal of 760,000 long tons per year as set forth in the series of four directives from the Executive Office of the President. This production goal was achieved through the operation of existing plants at capacity and the reactivation of plants previously maintained in standby.

At the beginning of the fiscal year, consumption of rubber by manufacturers was under control of the National Production Authority. However, the continuous excess of GR-S production over consumption during the first half of the year and the improved natural rubber position permitted the removal, by the National Production Authority, of restrictions on total use of GR-S as of January 1, 1952. During the last half of the fiscal year, it was possible to pattern GR-S production more closely to consumption and inventories increased at a slower rate. These trends are illustrated in the accompanying chart.

GENERAL PURPOSE (GR-S) SYNTHETIC RUBBER PRODUCTION, CONSUMPTION AND END OF PERIOD TOTAL STOCKS



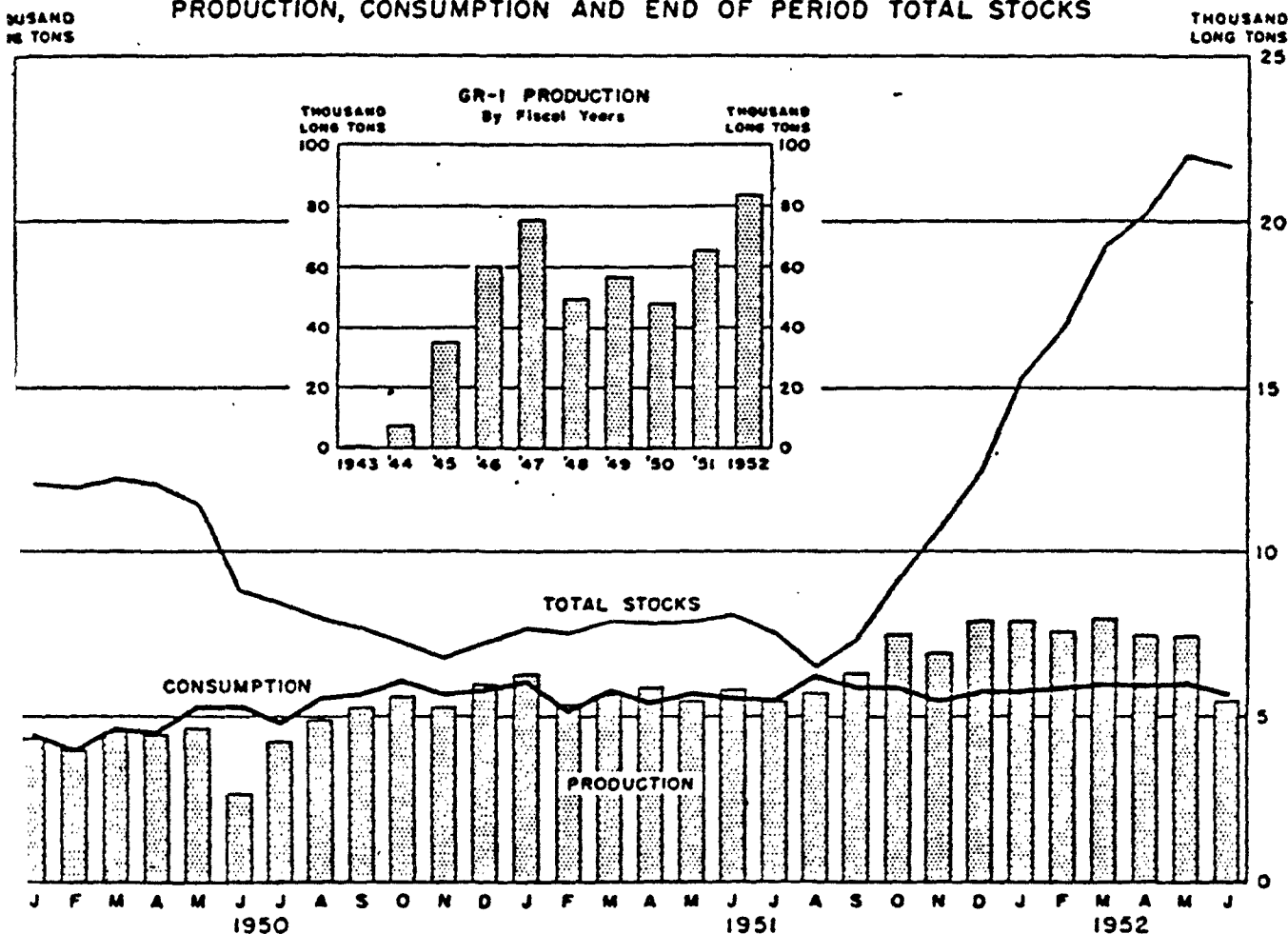
In order to meet established production goals of general purpose synthetic rubber and the consequent necessity of utilizing a high proportion of high cost alcohol butadiene, the selling price of GR-S was raised effective September 1, 1951 from 24.5 cents per pound to 26 cents per pound. Later in the year,

It became apparent that the established production rate was not required, use of alcohol butadiene was kept to a minimum thereby reducing the expected cost of production. Accordingly, the selling price of GR-S was reduced, effective March 8, 1952, to 23 cents per pound.

In the case of butyl (GR-I) synthetic rubber, production was lifted above consumption during the early months of fiscal year 1952, resulting in rising inventories during the remainder of the year. However, the long-term production-consumption relationship was not considered as favorable as in the case of GR-S and restrictions on industry consumption were not lifted by the National Production Authority until April, 1952. During the year the selling price of butyl remained unchanged at 20.75 cents per pound. The trends of production, consumption and total stocks for butyl are shown in the accompanying chart.

BUTYL (GR-I) SYNTHETIC RUBBER

PRODUCTION, CONSUMPTION AND END OF PERIOD TOTAL STOCKS



All restrictions, which had the effect of limiting or preventing exportation of synthetic rubbers, were lifted during the latter months of the fiscal year.

Manufacturing Activities

General

The Corporation retained in operation as of June 30, 1952, all twenty-eight facilities which constitute the synthetic rubber program. These facilities are operated under management contracts with private corporations. As of June 30, 1952, one of the alcohol butadiene plants was being placed in standby. In addition, one-third of the GR-S plant at Institute, West Virginia, had been removed from operation and instructions had been issued to the remaining alcohol butadiene plant to cease operations on September 1, 1952.

The twenty-eight plants consisted of thirteen copolymer plants, two butyl plants, ten butadiene plants, one styrene plant, one chemical plant and one development laboratory.

During fiscal year 1952, Government-owned plants produced 799,266 long tons of synthetic rubber including 715,732 long tons of general purpose (GR-S) synthetic rubber and 83,534 long tons of butyl (GR-I) special purpose rubber principally for pneumatic inner tubes. This total represented 65.2% of domestic new rubber consumption of 1,227,000 long tons. The Corporation also produced component materials for synthetic rubber manufacture which were not available in sufficient quantities from private industry. The major items of components produced were 580,700 short tons of butadiene from basic raw materials and 52,700 short tons of styrene.

The GR-S production rate during the first six months of fiscal year 1952 was only slightly below the 760,000 long tons annual rate which had been reached at the end of fiscal year 1951. However, during the second half of the fiscal year, as it became apparent that requirements had slackened, production was reduced in the most economical manner. This was accomplished by minimizing alcohol butadiene production by keeping units idle which were available for operation and toward the end of the year removing alcohol butadiene facilities from service. A major strike in the petroleum industry during May, 1952 was an added factor which contributed to the reduced annual production rate of 685,000 long tons during the last six months. Plans were also formulated to reduce production to even lower levels during fiscal year 1953. This involved removal of the remaining alcohol butadiene facilities from service and release of certain quantities of petroleum butadiene plant feedstocks to the Aviation Gasoline program.

On April 13, 1951, the Defense Production Administration directed the Corporation to expand the productive capacity to 860,000 long tons per year of general purpose rubber. Accordingly, a program was formulated to achieve this objective and to increase to 90,000 long tons per year the productive capacity of butyl. This program involves expansion and bottleneck removal within existing raw material and copolymer plants. It is anticipated that the program will be essentially completed by January 1, 1953.

The effective capacities of individual plants at the end of the fiscal year are shown in the table on page 22 of this report.

Important strides were taken in fulfilling the Corporation's responsibility to maintain an efficient and up-to-date synthetic rubber manufacturing industry. These included numerous process improvement items, provisions for facilities to manufacture new and special types of rubber, general expansion of capacity and replacement of worn-out and obsolete equipment.

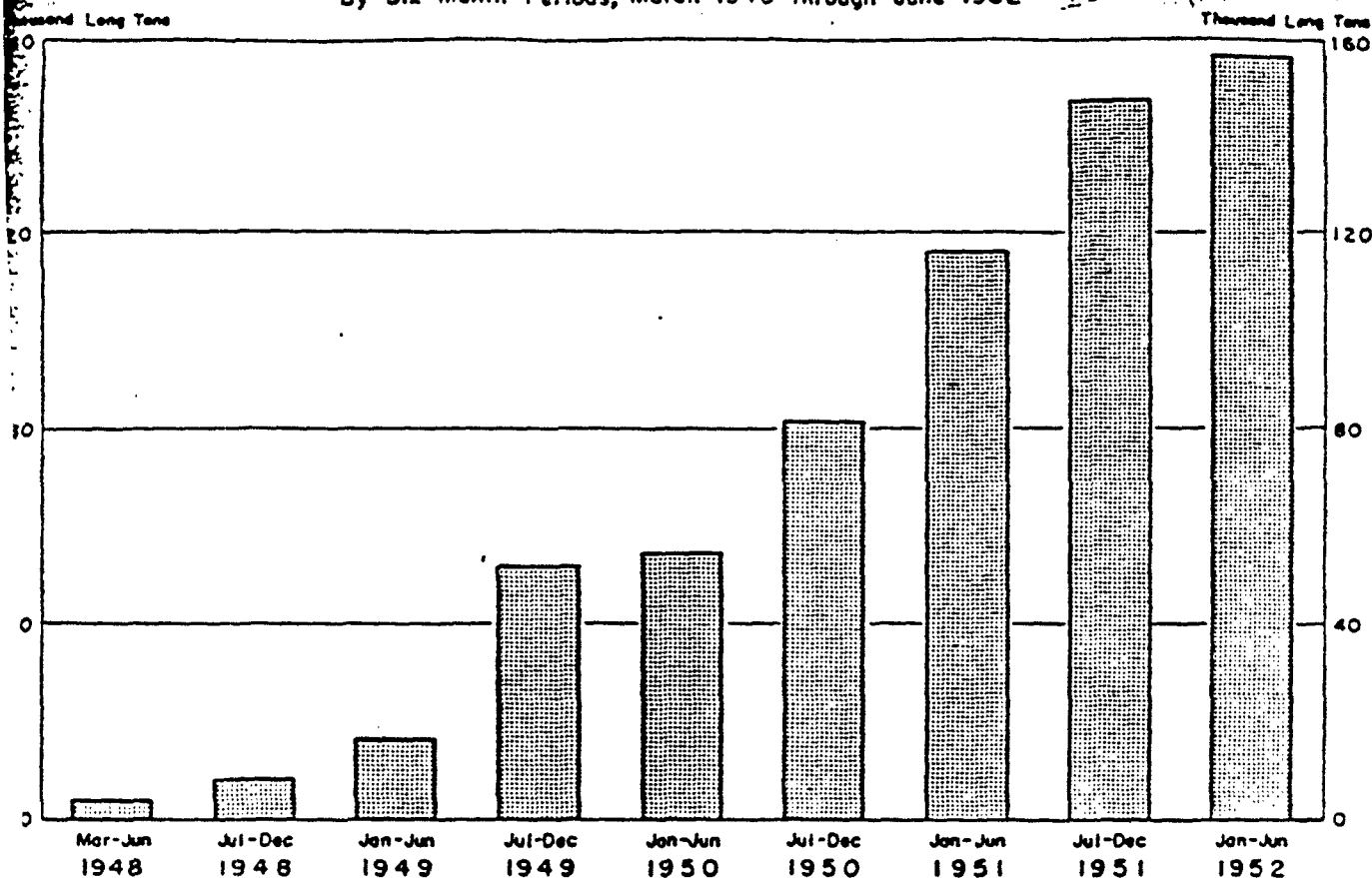
GR-S Plants

In the fiscal year 1952, eight of the thirteen copolymer plants in operation were producing cold rubber and three others were being converted to the production of cold rubber with completion expected during the first half of the fiscal year 1953. A total of approximately 304,000 net long tons of cold rubber was produced during the year, equivalent to about 43% of total GR-S production. Production of black masterbatch rubber amounted to approximately 101,700 net long tons, oil-black masterbatch 19,530 net long tons and oil masterbatch 37,920 net long tons. The greater portion of these masterbatch rubbers was produced by the cold process and the total is included in the figure shown above for cold rubber production. Five of the copolymer plants produced a total of approximately 34,240 long tons of GR-S latex during the year, a portion of which was the cold rubber type. The conversion to production of cold latex exclusively at one plant was essentially completed at the end of the year and initial production was commenced in July, 1952.

During the year the Corporation continued and accelerated the program to convert a large part of its facilities to the production of cold rubber in order to make available the industry's requirements of this product. Cold rubber possesses outstanding abrasion resistant properties and has gained acceptance by industry to an ever-increasing degree since initial production in 1948. The trend of cold rubber production in the Government-owned plants over the four and one-half year period is shown in the accompanying chart.

COLD RUBBER PRODUCTION

By Six Month Periods, March 1948 through June 1952



At the beginning of the fiscal year, cold rubber amounted to approximately 38% of total production. Completion of certain of the conversion projects made available capacity for producing cold rubber approximately 50% of total production by the end of the year. The cold rubber program received a setback when an explosion occurred at the Lake Charles, Louisiana, GR-S plant on June 28, 1952. This resulted in one-half of the plant being down for approximately six months and cold rubber production remaining half interrupted for a period of approximately two months. However, present inventories of cold rubber plus the indicated increases in production will assure satisfying future industry demand. Projects expected to be completed by January 1, 1953, will permit attainment of the goal of 50% of the total production of cold rubber as recommended by the NPA Rubber Industry Advisory Committee.

When restrictions on the total use of GR-S were lifted January 1, 1952, by the National Production Authority, a limitation was placed on the percentage of the total which could be cold rubber because of demand for this type rubber. The limitation was set at 46% for the first quarter of calendar year 1952, and was raised to 50% for the second quarter as more cold rubber became available. This was raised again in the third quarter to 70% and it is expected that this one remaining restriction will be eliminated by the end of the third quarter.

Manufacture of high-Mooney-oil-softened GR-S which was initiated during the previous year was continued and production was increased in line with the demand for this new material. In the production of oil extended GR-S, a relatively high Mooney viscosity rubber is produced at the copolymer plant and in 25% to 50% of an oil extender is added. The resultant product is superior for some uses and is the equivalent of the same quantity of GR-S produced at a normal Mooney viscosity. Introduction of a new product of this type necessarily requires extensive and time-consuming evaluation by the rubber industry.

Some indication of the gradual acceptance of oil masterbatch rubber by industry is given by the increase in production from approximately 2% of the total rubber production to approximately 6% over the 12-month period. The trend of acceptance of oil-black masterbatch is not as definite, however, and a longer period of evaluation by industry will probably be required. The production of black masterbatch rubbers experienced relatively small change over the previous year. However, in order to improve the rubber distribution pattern, facilities were authorized for producing black masterbatch rubber in the West Coast plant and installation was essentially completed by the end of the year.

GR-S latex has maintained an important position in the manufacture of foam sponge rubber and other special products. Production of this material amounted to approximately 5% of the total GR-S produced. Because of its superior properties, cold rubber latex is becoming of increasing importance in this field and conversions to the production of cold latex have been made in order to satisfy the indicated requirements. Over the twelve-month period, cold latex was increased from a level of approximately 5% to 25% of the total latex produced. Further increases will be possible during the early part of fiscal year 1953 when one of the Akron, Ohio GR-S plants, which was converted to cold latex exclusively, begins operation.

Butadiene and Styrene Plants

In line with operation of the program in the most economical manner, petroleum butadiene plants were maintained at maximum production consistent with either feedstock availability or plant capacity. Insofar as program flexibility would allow, alcohol butadiene was produced only in sufficient quantities to meet total butadiene requirements. During the first half of the year, butadiene was the limiting factor in the production of GR-S. This was due in large part to a series of events, such as feedstock shortages and fire damage to plants as previously mentioned. During the last half of the year, production of alcohol butadiene was minimized while reducing the production rate of GR-S.

In order to determine the applicability of a new butylene dehydrogenation catalyst, a plant scale evaluation was made at the Baytown, Texas butadiene plant. This catalyst is potentially important to the program because of the high indicated efficiency of butylene consumption in the manufacture of butadiene. The plant scale experimental run was successful in determining the engineering and technical data required to evaluate the feasibility and economics of utilizing this catalyst at the other petroleum butadiene plants.

Expansion of the Corporation's styrene plant at Torrance, California, was completed during the year and this plant is now capable of producing 57,000 short tons per year of styrene. Since this quantity of styrene is not sufficient to satisfy the needs of the program, the additional quantities required must be obtained by purchases from private suppliers.

Butyl Plants

After eliminating operating difficulties at one of the butyl plants, production of butyl rose considerably above industry consumption and record high rates of production were reached during several months of the year. Toward the end of the fiscal year, butyl production was decreased slightly in order to stabilize the rapid build-up of butyl inventories.

Work was continued during the year on the expansion program at the butyl plants concurrent with GR-S expansion. Installation of equipment as part of this program has been completed at the Baytown, Texas plant. However, the expansion program at the Baton Rouge, Louisiana plant will not be completed until next year.

Research Activities

During fiscal year 1952, research and development activities were conducted for the Corporation by eight industrial organizations operating GR-S production plants, by the Government Laboratories operated by the University of Akron, by a Government Tire Test Fleet at San Antonio, by the National Bureau of Standards, and by eleven universities, institutes, and other research organizations.

During the past year the following were among the most noteworthy accomplishments of the research program:

1. Oil-masterbatched GR-S was developed to the point where it has become an established production item because of a demonstrated improvement in treadwear performance over cold GR-S

at a substantial reduction in tire cost. This product also provides an expansion in apparent rubber supply with a minimum expenditure of raw materials and equipment.

2. A process using a so-called "Alfin" catalyst was developed and successfully carried out on a continuous pilot plant scale in the Government Laboratories. Substantial quantities of high molecular weight Alfin polymers were prepared for evaluation in tires and other essential products. Alfin polymers are extremely tough and yet are free from the degradation constituent known as "gel."
3. A type of GR-S approaching cold rubber in physical properties, but which can be produced in non-refrigerated equipment, was developed. Tests of the new synthetic on the Government Fleet totalling 600,000 tire miles, together with results reported on private tests, lead to the conclusion that it is definitely better for treadwear than hot rubber, and possibly equal to cold rubber. This development increases the productive flexibility of the Government-owned synthetic plants, because if full consumer acceptance of the new product is obtained on such matters as processability, the hot rubber capacity of the plants can be directed to the manufacture of an improved product. It is possible that further research and development may enable the new type of polymerization to be utilized for the production of synthetic rubber in cold rubber plant equipment so that a product even better than the present cold rubber may be eventually realized.

The results of research from all participants in the program are published as rapidly as they can be technically edited. During the past year, 94 articles were published in scientific or technical papers.

RFC formulates the over-all research program each year and with the aid of interrelated committees develops detailed plans, maintains a balance among the fundamental, applied, and developmental research work and facilitates a continuous exchange of research findings. The general objectives are to make synthetic rubber better and cheaper, and to produce it more efficiently.

Capital Improvements

During the fiscal year 1952 capital expenditures amounted to \$21,605,000 as compared to \$12,566,000 in the fiscal year 1951. These expenditures were for costs of (a) expansion of productive capacity; (b) conversion to cold rubber capacity; (c) process and other improvements; and (d) replacement of worn-out and obsolete equipment. The program for conversion to cold rubber upon completion will have cost approximately \$12 million.

Disposal of Rubber Facilities to Private Industry

In the latter part of the fiscal year consultations were had with committees representing chiefly the rubber, petroleum and chemical companies now active in the synthetic rubber program to elicit their views on the problem of disposal of the Government-owned rubber facilities. The Administrator of the Corporation appointed a Special Deputy, charged with the responsibility of formulating a program for disposal of the facilities. The Rubber Act requires that a report on such a program be submitted by the Corporation to the President and the Congress by March 1, 1953, and requires further that the President, after consultation with the National Security Resources Board, recommend to the Congress legislation with respect to disposal by April 15, 1953.

Statement of Operations

Net income for fiscal year 1952 amounted to \$16,113,542. This profit was attained despite curtailment of production in the latter part of the year when the demand was lower than the anticipated demand, expectation of which production in the earlier part of the year had been increased by use of the more costly alcohol butadiene in the manufacture of GR-S rubber. Due to labor difficulties in the petroleum industry, high cost alcohol butadiene was also used in the limited production for May, 1952. Also, \$1 million was provided to cover costs of shutting down excess production facilities and the inventory of alcohol on hand at the end of the year was written down by approximately \$5 million to estimated market value.

As a consequence of a demand for synthetic rubber lower than the production levels to which the Corporation had been directed to expand the capacity of its facilities, inventories of both GR-S and R-I increased during the course of the year. Inventories of GR-S increased from 29,000 long tons valued at \$10,926,000 at the beginning of the fiscal year to 72,000 long tons valued at \$27,889,000 at the close of the year. Inventories of GR-I increased from 3,600 long tons at a cost of \$1,352,000 on hand at the beginning of the year to 15,000 long tons at a cost of \$5,080,000 accumulated by the end of the year.

A financial statement presenting a summary of operations of the synthetic rubber program appears Schedule 2 of this report.

OPERATORS AND CAPACITIES OF GOVERNMENT-OWNED SYNTHETIC RUBBER FACILITIES

As of June 30, 1952

| <u>Operator</u> | <u>Plant Location</u> | <u>Type of Plant</u> | <u>Approx. Production Capacity, Tons/Yr.*</u> |
|---|-----------------------|--------------------------|---|
| Firestone Tire & Rubber Co. | Lake Charles, La. | GR-S | 90,000 |
| | Akron, Ohio | GR-S | 26,000 |
| B. F. Goodrich Chemical Co. | Port Neches, Texas | GR-S | 90,000 |
| | Institute, West Va. | GR-S | 115,000 |
| Goodyear Synthetic Rubber Co. | Houston, Texas | GR-S | 93,000 |
| | Akron, Ohio | GR-S | 25,000 |
| United States Rubber Co. | Port Neches, Texas | GR-S | 84,000 |
| | Naugatuck, Conn. | GR-S | 23,000 |
| General Tire & Rubber Co. | Baytown, Texas | GR-S | 36,000 |
| Phillips Chemical Co. | Borger, Texas | GR-S | 57,000 |
| Midland Rubber Corp. | Torrance, Calif. | GR-S | 72,000 |
| Copolymer Corp. | Baton Rouge, La. | GR-S | 42,000 |
| Kentucky Synthetic Rubber Corp. | Louisville, Ky. | GR-S | 41,000 |
| | | | <hr/> 794,000 |
| Cities Service Refining Co. | Lake Charles, La. | Butadiene from Butylenes | 62,000 |
| Copolymer Corp. | Baton Rouge, La. | Butadiene from Butylenes | 23,000 |
| Humble Oil & Refining Co. | Baytown, Texas | Butadiene from Butylenes | 51,500 |
| Neches Butane Products Co. | Port Neches, Texas | Butadiene from Butylenes | 174,000 |
| Sinclair Rubber, Inc. | Houston, Texas | Butadiene from Butylenes | 80,000 |
| Phillips Chemical Co. | Borger, Texas | Butadiene from Butane | 67,000 |
| Standard Oil Co. of Calif. and Shell Chemical Corp. | Torrance, Calif. | Butadiene from Butane | 58,000 |
| Carbide and Carbon Chemicals Div. Union Carbide and Carbon Corp. | Louisville, Ky. | Butadiene from Alcohol | 96,000 |
| Koppers Company, Inc. | Kobuta, Penn. | Butadiene from Alcohol | 128,000 |
| | | | <hr/> 739,500 |
| The Dow Chemical Co. | Torrance, Calif. | Styrene | 57,000 |
| Esso Standard Oil Co. | Baton Rouge, La. | Butyl Rubber | 47,000 |
| Humble Oil & Refining Co. | Baytown, Texas | Butyl Rubber | 43,000 |
| | | | <hr/> 90,000 |

* Capacities of rubber plants in net long tons/year, Monomer plants in short tons/year. GR-S plant capacities are for production of present types of rubber and do not represent maximum productive capacity in an emergency.